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Date: 18 June 2024

Origin: International

Latest date for receipt of comments: 10 July 2024

Project No. 2024/01791

Responsible committee: EPL/100 Audio-visual and Electronic equipment

Interested committees:

Title: BS EN IEC 63087 Assistive listening devices and systems for active assisted living

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

PROJECT NUMBER:

IEC 63087 ED1

DATE OF CIRCULATION:

2024-06-14

CLOSING DATE FOR COMMENTS:

2024-08-09

SUPERSEDES DOCUMENTS:

100/4147/RR**IEC TA 16 : ACTIVE ASSISTED LIVING (AAL), WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES, ACCESSIBILITY AND USER INTERFACES**

SECRETARIAT:

Germany

SECRETARY:

Mrs Ulrike Haltrich

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 29

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC☐ ENVIRONMENT☐ QUALITY ASSURANCE☐ SAFETY

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Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Assistive listening devices and systems for active assisted living

NOTE FROM TC/SC OFFICERS:

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FOREWORD

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109

INTRODUCTION

110 For a person with hearing difficulties, the audibility and intelligibility of speech and music is
111 degraded by the ambient sound and reverberation of the acoustic space in which it is heard.

112 Assistive listening enables the acoustic space to be bypassed through the direct transmission
113 of speech, music or other audio information to an end-user device (often a hearing-aid or
114 cochlear implant), delivered in a way that improves the listening experience for end-users.

115 An Assistive Listening System (ALS) is beneficial when the listener is located at some distance
116 from a talker or the source of sound and / or when the background noise level is such as to be
117 clearly audible – for example:

- 118 • A talker is using a raised voice when they are more than 3m from a listener or where the
119 ambient noise level exceeds 40 dBA.
- 120 • A talker is using normal, conversational voice levels in large spaces at distances greater
121 than 2m and/ or when the noise level exceeds 45 dBA.

122 In noisy environments, bringing an appropriate pick-up microphone into close to the talker or
123 desired sound source can increase the signal to noise ratio for the listener by as much as 15-
124 20 dB, and in enclosed spaces it can overcome the detrimental effects of reverberation as
125 compared to the normal listening situation. This can significantly increase speech intelligibility
126 and reduce listening effort.

127 An ALS is explicitly designed to deliver audible and intelligible sound wherever the end-user is
128 located within a room, area or at a specific service point, and in a manner that provides a
129 genuine benefit to the end-user.

130 ALSs have also been found to be beneficial for listeners with normal hearing but who are
131 listening in less-than-ideal acoustic conditions, such as in lecture theatres and classrooms.
132 Although predominantly used for speech, an ALS may also be used to improve the reception of
133 music or musical performances and in situations where both speech and music are present.

134

Assistive listening devices and systems

1 Scope

This document sets out the requirements for the provision of Assistive Listening Systems in places where there is a benefit for hearing-aid and cochlear implant users, or other hearing device users, compared to listening to the acoustic signal directly at that location.

This document applies to all ALS used for communication, entertainment, or educational purposes in public, private, domestic and public transport installations.

This document does not apply to any other audio transmission, for example audio translations, audio description, or audio-streams, such as from a multi-screen environment, where the sound is not acoustically audible, but provides useful ancillary information for such systems and shall be applied as far as possible.

Personal listening / intelligibility enhancement devices and systems are also included within the scope as they constitute a special case and incorporate some unique features and requirements.

This document does not apply to hearing aids and medical hearing devices themselves.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60118-4: Electroacoustics – Hearing aids: Induction-loop systems for hearing aid purposes – System performance requirements

IEC 60118-17: (Progress of standard to be monitored & action as required)

IEC 60268-8 Sound system equipment: automatic gain control devices

IEC 60268-16: Objective rating of speech intelligibility by speech transmission index

IEC TR 63079: Code of practice for hearing-loop systems (HLS)

IEC 62489-1: Electroacoustics – Audio-frequency induction loop systems for assisted hearing: Methods of measuring and specifying the performance of system components.

ETSI EN300 422-4 part 4 Assistive Listening Devices

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 accessibility

degree to which an ALS product (e.g., device, service, and environment) is available to the intended users and compatible with their listening devices

172 **3.2 AFFL – above finished floor level**

173 **3.3 AFILS – Audio Frequency Induction Loop System**

174 system including amplifier(s), microphones and/or other signal sources, in which magnetic fields
175 are created by the flow of audio-frequency current in a conductor arranged in the form of one
176 or more loops or a coil or solenoid.

177 Note: often called a hearing loop.

178 **3.4 Assistive Listening Device (ALD)**

179 a device that can directly access an ALS – e.g. Hearing Aid, Cochlear Implant, Hearable, Mobile
180 phone, ALS receiver or personal listener.

181 **3.5 Assistive Listening System (ALS)**

182 a device or system that helps people with hearing impairment to hear and understand wanted
183 sounds or enables them to access the sound being transmitted by a Public Address (PA),
184 Paging, Sound Reinforcement, or dedicated microphone system.

185 Note 1: Assistive listening systems may also be used by listeners who are not hard of hearing to improve the clarity
186 and intelligibility received speech.

187 Note 2: a personal listener may connect to an assistive listening system.

188 **3.6 audio over Wi-Fi™**

189 a system that enables wireless transmission of audio via a Wi-Fi network, allowing the user's
190 own device (smartphone or tablet) to act as the receiver.

191 **3.7 Auracast™**

192 a proprietary audio transmission system using Bluetooth® LE available from Bluetooth® core
193 Specification v5.3 onwards that enables several separate audio streams to be simultaneously
194 transmitted to multiple compatible listening devices at distances of typically up to 50m
195 depending on the local conditions and transmitter power. To allow as many receivers as
196 possible to access an audio stream within the reception range Auracast does not use a
197 traditional two-way Bluetooth® 'Connected link', instead relying on the stream source operating
198 as a 'Broadcast' transmitter and advertising its availability with a range of quality and access
199 options.

200 **3.8 automatic gain control (AGC)**

201 a means (other than peak clipping) by which the gain is automatically controlled as a function
202 of the level of the signal being amplified with the objective of providing a stable output signal
203 level.

204 Note also often called a leveller.

205 **3.9 Bluetooth / Bluetooth Classic**

206 a low power radio system that can continuously stream data over 79 channels in the 2.4 GHz
207 unlicensed industrial, scientific, and medical (ISM) frequency band.

208 **3.10 Bluetooth Low Energy (BLE)**

209 a Bluetooth® system designed for very low power operation, transmitting data over 40 channels
210 in the 2.4 GHz unlicensed ISM frequency band.

211 Note: – BLE remains in sleep mode except when a connection is initiated. Power consumption is lower and data
212 rates are higher than Classic Bluetooth, but connection is not continuous.

213 3.11 BYOD

214 Bring your own device – the scenario in which a user provides their own means to access an
215 ALS.

216 3.12 C50 – Clarity

217 a measure of the direct to reverberant ratio whereby the sound energy arriving within the first
218 50ms after the arrival of the direct sound is divided by the late sound energy arriving after 50ms.

219 Note: C50 provides a measure of the ratio of useful sound energy to later arriving and reverberant energy that is
220 considered to inhibit the intelligibility of speech and is often used as a measure of Direct to Reverberant (D/R) ratio.

221 3.13 Critical Distance (Dc)

222 The distance from a sound source, in a room or enclosed space, where the Direct and
223 Reverberant sound energies become equal.

224 3.14 Cochlear Implant (CI)

225 a cochlear implant is a small electronic medical device that electrically stimulates the cochlear
226 nerve to provide a sensation of sound.

227 Note 1: CIs comprise two parts, the implant and a control / processing device that is worn behind the ear in a similar
228 manner to a hearing aid.

229 Note 2: CI processing devices are generally fitted with a T-coil and so can be used with hearing loops and neck-
230 loops.

231 3.15 competent person

232 person with the relevant current training and experience, and with access to the requisite tools,
233 equipment, and information, and capable of carrying out a defined task

234 3.16 EHIMA European Hearing Instrument Manufacturers Association**235 3.17 ear hook**

236 a small inductive device in the form of a hook that sits behind the ear and is placed adjacent to
237 a hearing device in order to inductively transmit an audio signal to the device's telecoil.

238 3.18 echo

239 an undesired signal which arrives at a given point, with sufficient magnitude and delay for it to
240 be perceptible, as a distinct repetition of the direct signal.

241 Note: the audibility of an acoustic or audio echo depends on the magnitude of the signal and its relative delay, with
242 perception typically occurring with delays greater than 35 to 50 ms

243 3.19 electromagnetic interference (EMI)

244 interference that is caused by one electrical or electronic device to another by the
245 electromagnetic fields generated by its operation.

246 3.20 emergency sound system (ECS)

247 a sound system specifically intended to broadcast emergency announcements and messages.

248 Note: such systems generally incorporate fault and status monitoring and are required to meet associated national
249 or international standards.

250 3.21 FM/ Radio assistive listening system

251 an assistive listening transmission system based on radio technology.

252 Note: FM/radio assistive listening receivers may be connected to a neck-loop so that the signal may be received by
253 a compatible hearing aid or cochlear implant.

254 3.22 hearable

255 a type of personal listener, usually in the form of personal earbuds or earphones that contain
256 both a pickup microphone and loudspeaker in each unit together with complex speech and noise
257 suppression processing to provide sound amplification.

258 Note: hearables are often termed 'over the counter', non-prescription hearing aid devices.

259 3.23 hearing aid (HA)

260 portable instrument intended to assist the hearing of persons with impaired hearing, usually
261 consisting of a microphone, amplifier and earphone or bone vibrator.

262 Note: A hearing aid is a medical device selected and fitted by an appropriately trained and competent hearing care
263 professional.

264 3.24 hearing device (HD)

265 a user device which can directly access an ALS – e.g., Hearing Aid, Cochlear Implant, Hearable,
266 Mobile phone, ALS receiver, or personal listener etc.

267 3.25 hearing loop

268 an audio frequency induction loop (AFILS) assistive listening technology.

269 Note: A loop or loops of cable or copper tape are typically installed at floor level in a room or area to be covered to
270 create an electromagnetic field that can be picked up by a hearing aid, cochlear implant or listening device employing
271 a suitable pick up or telecoil. The loop is fed from either a dedicated pick-up microphone or from the output of a
272 sound system.

273 3.26 hearing loss

274 the reduction in hearing acuity

275 Note 1: Hearing loss is a common problem caused by exposure to noise, aging, disease, trauma, and heredity.

276 Note 2: Four different levels of hearing loss have been defined: Mild (25-45dB loss), Moderate (40-75dB loss), Severe
277 (75-90dB loss) and Profound (>90dB loss)

278 3.27 HoW - House of Worship**279 3.28 infrared (IR) assistive listening system**

280 an assistive listening transmission system based on infrared technology.

281 Note1: IR systems are often used in environments where it is desired to contain the signal within the confines of a
282 room.

283 Note2: IR assistive listening receivers may incorporate a neck-loop so that the signal may be received by a compatible
284 hearing aid or cochlear implant.

285 3.29 ISTS International speech test signal

286 ISTS was developed by EHIMA to create reproducible measurement conditions for the purpose
287 of analysing the processing of speech by a hearing aid and associated equipment. ISTS is a
288 standard test signal which features all or most relevant properties of natural speech e.g. the
289 modulation spectrum, the fundamental frequency and its harmonics.

290 Note: The ISTS is based on natural recordings but is largely non-intelligible because of segmentation and remixing.
291 The signal comprises real speech from multiple talkers but presented in a manner such as to have no meaning nor
292 gaps between words.

293 **3.30 loop receiver**

294 a device fitted with a telecoil / T-coil allowing it to pick up signals from a hearing loop.

295 **3.31 latency**

296 the discrepancy in time between when an audio signal enters a system or electronic device and
297 when it emerges.

298 Note – Potential causes of latency in an audio system include analogue-to-digital conversion, buffering, digital signal
299 processing, transmission time, digital-to-analogue conversion, and the speed of sound in the transmission medium.

300 **3.32 Lip Sync**

301 the synchronisation of the visual image of the face and lips with the associated audio speech
302 signal

303 Note: to enable lip reading, the maximum allowable discrepancy between the visual and audio signals is 40ms

304 **3.33 Long Term Average Speech Level (LTASL)**

305 the unweighted speech signal level averaged over a period of at least 30 seconds

306 Note This may be measured either as an Leq value or by means of a r.m.s. meter with suitably long integration time.

307 **3.34 neckloop**

308 a device that allows a personal listener or ALS receiver to be used with a hearing aid that is
309 fitted with a telecoil.

310 Note 1: A neckloop shall provide a signal compliant to IEC 60118-4 when measured as specified in IEC 62489-1

311 Note 2: Neck-loops are usually passive devices and often dedicated to a particular receiver, although active types
312 and non-product specific types are also available.

313 **3.35 personal listener**

314 a system for relaying an acoustic input signal to an acoustic output transducer, for listening
315 purposes. A system will at least comprise a microphone, an amplifier and earphones or
316 headphones.

317 Note 1: Additional items can be included, such as a neck-loop for use with hearing aids, or a magnetic pick-up coil
318 for use with hearing-loop systems.

319 Note 2: The sound picked up by a personal listener may also be transmitted directly to a hearing aid via Bluetooth
320 or other, defined, radio-based system.

321 **3.36 recruitment**

322 the rapid and abnormal growth of perceived loudness of sounds for those with a hearing
323 impairment and which is frequency-dependent in nature.

324 **3.37 remote (extension) microphone**

325 a microphone, specifically intended to pick up the wanted sound to enable it to be broadcast to
326 an assistive listening system, personal listener, or hearing device.

327 Note 1: for speech applications the microphone needs to be located close to the talker to minimise the pick-up noise
328 and reverberation.

329 Note 2: remote microphones may be active devices and incorporate speech processing technology, such as acoustic
330 noise cancellation, or filtering to enhance the intelligibility of the speech signal.

331 Note 3: remote microphones may transmit their signal wirelessly or via a cable

332 **3.38 signal to noise ratio (SNR)**

333 the ratio between the desired audio or acoustic signal or the power of a signal and the undesired
334 signal or the power of the background noise.

335 **3.39 soundfield system**

336 a dedicated sound system, usually employing distributed or directional loudspeakers, to provide
337 an amplified speech signal to hard of hearing listeners.

338 Note: Soundfield systems are most frequently used in school and classroom applications.

339 **3.40 speech transmission index (STI)**

340 an objective, electroacoustic method of assessing the potential intelligibility of a
341 communication, sound, or assistive listening system.

342 **3.41 talkbox**

343 loudspeaker mounted in an enclosure designed to exhibit directivity and radiation patterns
344 similar to those of the average human head and produce a calibrated frequency response for
345 reproduced test signals.

346 **3.42 telecoil (T-coil)**

347 a small induction pickup coil used to receive an audio signal from a Hearing Loop or portable
348 loop device.

349 Note 1: T coils can be found inside most behind the ear, in the ear and open fit hearing aids.

350 Note 2: Not all hearing aids incorporate a T-coil and those that do may need to have their T-coil specifically activated.

351 **3.43 VACIE**

352 voice alarm, control and indicating equipment

353 **3.44 venue**

354 any building, space, site or facility that contains an assistive listening system.

355 **3.45 voice alarm (VA) system**

356 a sound distribution or public address system specifically intended to broadcast emergency
357 announcements and messages that meets the requirements of national or international Fire
358 Alarm standards and codes of practice.

359 Note: such systems are mandated to incorporate fault and status monitoring and be configured from equipment that
360 meets specific build and performance regulations

361 **Further terms to be added as required**

362 **4 Objectives of an ALS as required by the end user**

363 Where the distance between a hearing device user and a person talking to them exceeds
364 approximately 2-3m, the effects of room reverberation and background noise may make it